

CLAIMS

1. Membrane electrochemical generator fed with gaseous reactants and comprising a multiplicity of reaction cells assembled in a filter-press configuration, each of said reaction cells being delimited by bipolar sheets, characterised in that said bipolar sheets are formed by a metallic central body integrated in a frame made of polymeric material and containing distributing and collecting channels.
2. Generator according to claim 1, characterised in that said polymeric material is of the thermoplastic type.
3. Generator according to claim 1, characterised in that said polymeric material is of the thermosetting type.
4. Generator according to anyone of the preceding claims, characterised in that said frame is integrated with said central metallic body by moulding.
5. Generator according to claim 4 characterised in that said metallic central body is previously provided with leachable elements having the shape of said distributing and collecting channels and that said leachable elements are dissolved with a reactant after said moulding.
6. Generator according to claim 5 characterised in that said leachable elements are made of aluminium and said reactant is caustic soda.
7. Generator according to claim 4 characterised in that said metallic central body is previously provided with preformed elements having the shape of said distributing and collecting channels.
8. Generator according to claim 7 characterised in that said preformed elements are made of metal or plastics
9. Generator according to claim 8 characterised in that said metal is stainless steel

10. Generator according to anyone of claims 1 to 3 characterised in that said frame integrated with said metallic central body consists of two preformed components containing said distributing and collecting channels.
11. Generator according to claim 10 characterised in that each of said two preformed components constitutes a face of said frame.
12. Generator according to anyone of claims 10 or 11 characterised in that said two components are assembled with each other and with said metallic central body by thermal bonding or gluing with an adhesive.
13. Generator according to anyone of claims 4 or 12 characterised in that said metallic central body has a micro-rough and/or chemically reactive surface obtained by sandblasting and/or chemical attack.
14. Generator according to claim 4 characterised in that said metallic central body is provided with openings in the peripheral zone suited to favour the adhesion of said moulded frame.
15. Generator according to anyone of the preceding claims, characterised in that said frame comprises first and second feed openings for the passage of said gaseous reactants, first and second discharge openings for the withdrawal of said reaction products optionally mixed with exhausts, openings for feeding and extracting a coolant, said openings being in communication with said distributing and collecting channels.
16. Generator according to claim 15, characterised in that in a filter-press configuration the coupling between said openings of said frames determines the formation of longitudinal feed manifolds, the coupling between said discharge openings determines the formation of longitudinal discharge manifolds, the coupling between said openings for feeding and extracting a coolant determines the formation of manifolds for circulating said coolant.

17. Generator according to claim 15 characterised in that said frame further comprises a multiplicity of holes for housing tie-rods by means of which the tightening of said electrochemical generator is accomplished.
18. Generator according to anyone of the preceding claims, characterised in that it comprises a multiplicity of cooling cells interposed between said reaction cells, each cooling cell being delimited by a pair of said bipolar sheets.
19. Generator according to anyone of the preceding claims, characterised in that said metallic central body comprises a multiplicity of first calibrated holes for the passage of said gaseous reactants and a multiplicity of second calibrated holes for the discharge of reaction products and optionally exhausts.
20. Generator according to claim 19 characterised in that said first calibrated holes are mutually aligned and positioned in correspondence of said distributing channels of said frame and that said second calibrated holes mutually aligned and positioned in correspondence of said collecting channels of said frame.
21. Generator according to anyone of claims 19 or 20 characterised in that said first and second calibrated holes are spaced by about 1 mm from the inner edge of said frame.
22. Generator according to anyone of claims 19-21 characterised in that said first calibrated holes have a diameter comprised between 0.1 and 5 mm.
23. Generator according to anyone of claims 1-18 characterised in that said metallic central body comprises a multiplicity of aligned calibrated holes for injecting water into said reaction cells.
24. Generator according to claim 23 characterised in that said aligned calibrated holes are positioned in correspondence of additional water distributing channels.
25. Generator according to claim 23 characterised in that said aligned calibrated holes are spaced by about 1 mm from the inner edge of said frame.

26. Generator according to anyone of claims 1-18 characterised in that said central body comprises a multiplicity of aligned calibrated holes for distributing the gaseous reactants, a multiplicity of aligned calibrated holes for injecting water and a multiplicity of aligned calibrated holes for withdrawing the products, the exhausts and the residual injected water, each of said calibrated holes positioned in correspondence of one of said distributing or of said collecting channels.
27. Generator according to claim 26 characterised in that said aligned calibrated holes for distributing the gaseous reactants and said aligned calibrated holes for withdrawing the products, the exhausts and the residual injected water are spaced by about 1 mm from the inner edges of said frame.
28. Membrane electrochemical generator substantially as hereinbefore with reference to the attached drawings.